

PATENT ABSTRACTS OF JAPAN

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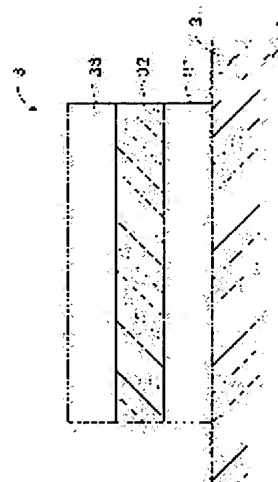
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(54) BATTERY CASE AND ITS MANUFACTURING METHOD

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a battery case in a nickel metal-hydride battery and its manufacturing method, wherein leakage of hydrogen molecule and steam outside from the wall of the battery case causing deterioration of battery performance are prevented, and wherein a long life-time and the free maintenance over a long term are possible.

SOLUTION: In the resin-made battery case for the nickel metal-hydride battery, via a resin layer 31 playing a role as a binder, a metal thin layer 32 consisting of a metallic foil or vapor-deposited metal layer playing a role as a gas barrier to prevent the leakage of the hydrogen molecule and the steam is integrally formed at least on the outer face of a part of the case side part, and furthermore, a resin layer 33 to play a role of protecting the metal thin layer 32 from corrosion is formed on this.



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CLAIMS

[Claim(s)]

[Claim 1]

It sets in the cell case made of resin for the nickel hydride batteries of the shape of closed-end hollow equipped with opening, the flank, and the pars basilaris ossis occipitalis, and this case flank is the cell case characterized by forming in one the metal thin layer which consists of a metallic foil or a metal vacuum evaporation layer through a resin layer on external surface a part at least.

[Claim 2]

The cell case of said metal thin layer according to claim 1 which formed the resin layer in one on the front face in part at least.

[Claim 3]

Said metal thin layer is a cell case according to claim 1 or 2 which consists of any one in aluminum, stainless steel, pure iron, nickel, and titanium, or two or more.

[Claim 4]

Said metal thin layer is a cell case according to claim 1 or 2 which consists of aluminum.

[Claim 5]

The resin layer formed on the front face of said metal thin layer is a cell case according to claim 2 to 4 which consists of any one in a polyamide, polypropylene, polyethylene, and polyethylene terephthalate, or two or more.

[Claim 6]

The resin layer formed on the front face of said metal thin layer is a cell case according to claim 2 to 4 which consists of a polyamide.

[Claim 7]

Said cell case made of resin is a cell case according to claim 1 to 6 which consists of mixture of polypropylene or polypropylene, and a polyphenylene ether alloy.

[Claim 8]

the weight of the mixture of said polypropylene and polyphenylene ether alloy -- the cell case according to claim 7 which are within the limits from 5:5 to 10:0 when a mixing ratio sets the whole to 10, and a polypropylene:polyphenylene ether alloy expresses.

[Claim 9]

The resin layer which intervenes between the external surface of said cell case made of resin and a metal thin layer is a cell case according to claim 7 or 8 which consists of polypropylene.

[Claim 10]

In case the closed-end hollow-like cell case made of resin where have opening, a flank, and a pars basilaris ossis occipitalis, and the interior turns into the cell formation section or a battery holder is cast By allotting the monolayer or the double layer membrane which each layer becomes from a metal thin layer or a resin layer beforehand to the crevice formed in metal mold, and casting this case by resin injection into said crevice The manufacture approach of the cell case which can form said monolayer or a double layer membrane in manufacture and coincidence of this case in one at a part or the whole on this case external surface.

[Claim 11]

In case the cell case made of resin for the nickel hydride batteries of the shape of closed-end hollow equipped with opening, the flank, and the pars basilaris ossis occipitalis is cast By allotting the double layer membrane

which has a metal thin layer and a resin layer at least beforehand to the crevice formed in metal mold, and casting this case by resin injection into said crevice The manufacture approach of the cell case which can form said double layer membrane in manufacture and coincidence of this case in one at a part or the whole on this case external surface.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]

This invention relates to the cell case and its manufacture approach of the nickel hydride battery with which a power machine is carried in the car considered as concomitant use with power or power, and an internal combustion engine.

[0002]

[Description of the Prior Art]

In recent years, it is pressed for the transportation device which makes power the internal combustion engine represented in an automobile by the need of adopting sources of power other than an internal combustion engine, in the face of the air pollution problem and the warming problem of the earth by exhaust gas. The approach of making power with which development is made as a substitute source of power more briskly than before the source of power is mentioned. For example, if it says about an automobile, EV (Electric Vehicle) which adopted the rechargeable battery, HEV (Hybrid Electric Vehicle) which used together the rechargeable battery and the internal combustion engine are put in practical use, respectively.

[0003]

In order to raise cell engine performance, such as electromotive force and charge capacity, in the limited cell tooth space, it is indispensable to form a cell into small lightweight. At the point, according to the description that the internal pressure of a cell case does not go up a nickel hydride battery, since it is possible to make thickness of the wall of this case thin, it can be said that it is a cell suitable for small lightweight-ization. Furthermore, since it also has the advantage of bringing the good starting characteristic to a car with the outstanding low-temperature property, the nickel hydride battery is widely used as a cell for cars. In addition, as an ingredient of a cell case, many things made of resin are used for insulation, lightweight-izing, etc.

[0004]

[Problem(s) to be Solved by the Invention]

However, if thickness of the wall of a cell case is made thin too much, when the hydrogen content child and steam generated from the hydrogen storage material in this case will pass through the wall of this case and will leak and come outside for the formation of small lightweight In order that a presentation and concentration of an electrolyte might change, the lid which takes and changes a case or has been sealed since the cell engine performance falls and a battery life becomes short was opened, and there was a trouble that a troublesome activity had to be done, at the high cost of filling up and sealing an electrolyte.

[0005]

So, it aims at offering the cell case and its manufacture approach for the nickel hydride battery in which the leakage to the outside from the wall of the cell case of the hydrogen content child who causes cell performance degradation, or a steam is prevented, as a result a life is long, and the maintenance free over a long period of time is possible in this invention.

[0006]

[Means for Solving the Problem and its Function and Effect]

In order to solve the above-mentioned technical problem, in this invention, it is characterized by forming at least the metal thin layer which consists of a metallic foil or a metal vacuum evaporatio layer in one through a resin layer on the 1 outside side of this case flank in the cell case made of resin for the nickel hydride batteries

of the shape of closed-end hollow equipped with opening, the flank, and the pars basilaris ossis occipitalis.

[0007]

In such a case, the metal thin layer currently formed in one on the case lateral surface works as gas barrier which dams up the hydrogen content child from whom it is going to begin to leak from the inside of a case, and a steam. The amount of the hydrogen content child who leaks and comes out from the inside of a case by this compared with the case where there is no metal thin layer, or a steam is controlled dramatically. Consequently, since the concentration of an electrolyte and change of a presentation are also fully controlled, prevention of cell performance degradation will be attained, as a result the long nickel hydride battery of a battery life will be obtained.

[0008]

Moreover, the resin layer which intervenes between the lateral surface of a case and a metal thin layer is bearing a role of a binder for sticking a case and a metal thin layer.

[0009]

Moreover, in this invention, even if [a part of] there are few metal thin layers, the resin layer is formed in one on a front face. Since an electrolyte adheres in a production process etc., it is easy to corrode and the metal thin layer which works as gas barrier is protected from corrosion with the property (chemical resistance) which cannot be easily invaded by the acid or base of resin when the front face of a metal thin layer is protected in a resin layer as mentioned above, the cell engine performance will be stabilized more by the front face of a metal thin layer.

[0010]

Moreover, any one in aluminum, stainless steel, pure iron, nickel, and titanium or two or more are used for a metal thin layer. Since these are excellent in the effectiveness which dams up a hydrogen content child and a steam since molecular weight is large, and they are further excellent in malleability, processing for forming a metal thin layer in one on a case outside surface is easy for them. Moreover, stainless steel and nickel are strong to corrosion, and pure iron also has the property in which it does not have a bad influence on a cell.

[0011]

Since especially aluminum is cheap also in the above-mentioned metal, it is easy to process it since it excels in malleability, and it has the property in which vacuum evaporation is also easy, the good metallic foil metallurgy group vacuum evaporation film is obtained.

[0012]

Moreover, since the resin layer formed on the front face of a metal thin layer achieves the duty which protects a metal thin layer front face from the corrosion by adhesion of an electrolyte, any one in a polyamide excellent in the property (chemical resistance) which can be easily invaded by neither an acid nor the base, polypropylene, polyethylene, and polyethylene terephthalate, or two or more are used for it.

[0013]

Especially a polyamide is cheap also in the above-mentioned resin, and it is hard to be torn, and has the property to excel in reinforcement.

[0014]

The ingredient of said cell case will be considered that polypropylene is suitable if it takes cheap being a thing, that molding is easy, excelling in thermal resistance, and that an acid and a base are hard to be invaded (chemical resistance) into consideration. Moreover, in a polypropylene simple substance, since it has the property in which reinforcement is weak that it is easy to deform, in order to raise reinforcement, according to an application, using the mixture of polypropylene and a polyphenylene ether alloy is also considered.

[0015]

the weight of the mixture of polypropylene and a polyphenylene ether alloy -- when the whole is set to 10, and a polypropylene:polyphenylene ether alloy expresses a mixing ratio, it is desirable that they are within the limits from 5:5 to 10:0. furthermore -- this -- the range of a mixing ratio from 5:5 to 9.95:0.05 is desirable, and its range from 5:5 to 8:2 is especially desirable.

[0016]

Moreover, polypropylene is used for the resin layer which intervenes between the external surface of a case and metal thin layers which play a role of a binder when the mixture which contains polypropylene in the ingredient of a case as mentioned above is used. Thereby, since the junction nature of case external surface and a resin

layer increases, it becomes possible to stick a metal thin layer on case external surface more.

[0017]

In case a cell case is cast according to the manufacture approach of the cell case of above-mentioned this invention By allotting the monolayer or the double layer membrane which each layer becomes from a metal thin layer or a resin layer beforehand to the crevice formed in metal mold, and casting this case by resin injection into a crevice It is characterized by forming said monolayer or a double layer membrane in one at a part or the whole on this case external surface at manufacture and coincidence of this case.

[0018]

By allotting the double layer membrane which has a metal thin layer and a resin layer beforehand to the field which hits the flank of the cell case in the crevice formed in metal mold, and casting a case by resin injection into a crevice It becomes possible to form in one the double layer membrane which consists of the metal thin layer which works as gas barrier, a resin layer which intervenes between this case lateral surface and this metal thin layer, and a resin layer which protects this metal thin layer on the case lateral surface at molding of a case and coincidence.

[0019]

Since it is possible to form a double layer membrane in one on the case lateral surface at molding of a case and coincidence when a cell case is cast by such process, since the time and effort of a process can be saved, compared with the process like installation of the double layer membrane after molding, productivity improves only a cell case. Furthermore, the direction which forms a double layer membrane in case molding and coincidence also produces the advantage that the degree of adhesion between a case and a double layer membrane can be raised, rather than the case where a double layer membrane is attached after molding.

[0020]

It becomes it is possible to prevent the leakage to the outside from the wall of the cell case of the hydrogen content child who causes cell performance degradation, or a steam in the cell case of this invention, and possible as mentioned above, to obtain the nickel hydride battery in which the maintenance free over a long period of time with a life long by this is possible.

[0021]

[Embodiment of the Invention]

Hereafter, the example of 1 operation gestalt of this invention is explained using an attached drawing.

Drawing 1 (a) is the perspective view showing 1 operation gestalt of the cell case of this invention. The cell case 1 of this invention is a case made of the resin of the shape of closed-end hollow equipped with opening, flank, and pars basilaris ossis occipitalis which serve as a nickel hydride battery by filling up with and sealing an electrolyte to a battery holder 10, and the double layer membrane 3 containing the metal thin layer which consists of the resin film and a metallic foil, or a metal vacuum evaporation layer is formed in the flank 2 of this case in one with the flank 2 of this case so that a part or all of a flank 2 may be covered. With this operation gestalt, although the configuration of the cell case 1 illustrates the thing of an abbreviation rectangular parallelepiped, a configuration can carry out a design change suitably.

[0022]

The cell case 1 can be constituted as a gestalt which put two or more tubed battery holders 10 in a row. That is, desired electromotive force is acquired by connecting to a serial each nickel hydride battery made by filling up with and sealing an electrolyte to the battery holder 10 of these each. Furthermore, as the broken-line section of drawing 1 (a) shows, required power is adjusted by using two or more these cell cases 1, putting them in a row. Again. Each of a battery holder 10 is depended septum 12, and is divided, and the insulation between the mutual battery holders 10 is secured. In addition, the pars-basilaris-ossis-occipitalis side of the cell case 1 is made broader in the direction of a list of a battery holder 10 than an opening side in order to improve stability. In addition, although not illustrated, after a nickel hydride battery is contained by the battery holder 10 of this invention, it is covered and will be in a sealing condition.

[0023]

Drawing 1 (b) shows [the cell case 1 and this case 1] a sectional view parallel to a perpendicular and the receipt direction of a cell in the direction of a list of a battery holder 10 for the lid 4 for wrap sealing. The pars basilaris ossis occipitalis of this case 1 is [the thickness of the wrap lid 2 of about 4mm in thickness and a flank] about 2.5mm about about 1.5mm in thickness, and this case 1. The resin film and the double layer

membrane 3 which consists of a metal thin layer are formed in the flank of this case 1 in one with the flank 2 of this case so that a part or all of a flank 3 may be covered.

[0024]

The ingredient of the cell case 1 will be considered that polypropylene is suitable if it takes cheap being a thing, that molding is easy, excelling in thermal resistance, and that an acid and a base are hard to be invaded (chemical resistance) into consideration. Moreover, in a polypropylene simple substance, since it has the property in which reinforcement is weak that it is easy to deform, in order to raise reinforcement, according to an application, using the mixture of polypropylene and a polyphenylene ether alloy is also considered. In addition, the weight of the mixture of polypropylene and a polyphenylene ether alloy -- when a polypropylene:polyphenylene ether alloy expresses a mixing ratio, it is desirable that they are within the limits from 5:5 to 10:0. Furthermore -- this -- the range of a mixing ratio from 5:5 to 9.95:0.05 is desirable, and its range from 5:5 to 8:2 is especially desirable.

[0025]

Drawing 2 shows the sectional view of the multilayers 3 of drawing 1, and the resin film and the double layer membrane 3 which consists of a metal thin layer are formed in the state of one-and adhesion with the flank 2 of a cell case on the outside front face of the flank 2 of a cell case. The items of the double layer membrane 3 serve as the metal thin layer 32 which plays a role of gas barrier for preventing the leakage of the resin layer 31 and hydrogen content child who play a role of a binder, or a steam sequentially from the direction near the outside front face of the flank 2 of a cell case as follows, and the resin layer 33 which carries out the role which protects the front face of the metal thin layer 32 from corrosion on it further.

[0026]

Since the metal thin layer 32 works as gas barrier which dams up the hydrogen content child from whom it passes through the flank 2 of a cell case, and is going to begin to leak from the inside of the cell case 1, and a steam, as for prevention ***** of cell degradation, the increment in a battery life will be acquired from the reason explained above.

[0027]

The metal thin layer 32 may really fabricate the laminate film which may be made to vapor-deposit a metal molecule, and may form on the resin layer 31, or contains a metallic foil on a cell case side face.

[0028]

Moreover, since its effectiveness which dams up a certain forge-fire hydrogen content child and a steam is strong if the material of the metal thin layer 32 is a metal with large molecular weight, it is thought that various metals are suitable. If an example is given, it will be thought that aluminum with sufficient malleability, stainless steel and nickel strong against corrosion, the pure iron that does not have a bad influence on a cell, titanium with easy processing it thinly, etc. are suitable.

[0029]

Since it excels and is especially the easiest to process malleability also in the above-mentioned metal, production and vacuum deposition of a metallic foil are considered that it is appropriate to use easy aluminum.

[0030]

Moreover, the resin layer 31 which plays a role of a binder improves compatibility of the metal thin layer 32 and the front face of the flank 2 of a cell case, and since it is formed in order to stick these both in one, the material of the resin layer 31 has the resin and this component of the cell case 1 at least, and consists of resin which resin layer 31 self can join to the metal thin layer 32 in one.

[0031]

Since the material of the cell case 1 is the mixture of a polypropylene simple substance or polypropylene, and a polyphenylene ether alloy, specifically, it is thought that polypropylene is suitable for the material of the resin layer 31 which plays a role of a binder.

[0032]

Moreover, the resin layer 33 which achieves the duty of the protective layer which protects the metal thin layer 32 from the electrolyte adhesion **** corrosion in a production process etc. consists of resin with the property (chemical resistance) which can be easily invaded by neither an acid nor the base.

[0033]

It is thought appropriate to use any one of the polyamide which specifically excelled [material / of the

protective layer 33 for corrosion prevention] in the property (chemical resistance) which can be easily invaded by neither an acid nor the base, polypropylene, polyethylene, and the polyethylene terephthalate.

[0034]

Especially, also in the above-mentioned resin, it is the hardest to be torn and it is thought appropriate to use the polyamide excellent in reinforcement.

[0035]

The purpose of carrying out the lightweight miniaturization of the cell case with work by making the double layer membrane 3 into the gas barrier, If a cost side is taken into consideration, it is suitable for the metal thin layer 32 that it is below $1.0 \times 10^{-4} \text{m}$ ($= 0.1 \text{mm}$) more than $1.0 \times 10^{-10} \text{m}$ ($= 1 \text{\AA}$). It is thought that it is suitable for the resin layer 31 and the resin layer 33 respectively that it is below $1.0 \times 10^{-4} \text{m}$ ($= 0.1 \text{mm}$) more than $5.0 \times 10^{-6} \text{m}$ ($= 5 \text{ micrometers}$).

[0036]

An example of the manufacture approach of the cell case 1 of this invention described above is described below.

Although the conventional cell case can be easily manufactured with the well-known injection molding method which injects and casts resin to the cavity cast by metal mold By the manufacture approach of this invention, in the location equivalent to the flank of a cell case in a cavity The double layer membrane 3 with which the metal thin layer 32 which works as gas barrier, the resin layer 31 which intervenes between the front face of the flank 2 of a cell case and the metal thin layer 32, and the resin layer 33 which protects the metal thin layer 32 were united is beforehand allotted by the vacuum etc. Then, the cell case 1 which formed the double layer membrane in one on the case lateral surface at molding of a cell case and coincidence can be acquired by injecting resin.

[0037]

As mentioned above, it cannot be overemphasized that it can carry out in various modes in the range which this invention is not limited to the gestalt of operation and does not deviate from a summary. Moreover, the drawing refuses that it is typical drawing for an understanding.

[Example]

[0038]

The experimental result hereafter performed in order to check the effectiveness of this invention is explained.

[0039]

(Example 1)

Based on the manufacture approach of above-mentioned this invention, the cell case which allotted the double layer membrane which becomes the lateral-surface section from a metal and resin was produced. This case consists of polypropylene and the thickness of a flank is 1.219mm in the case used for 1.176mm and steam exsorption measurement in the case used for hydrogen gas leakage measurement. Moreover, as for the wrap double layer membrane, polypropylene resin with a thickness of 0.020mm, aluminium foil with a thickness of 0.050mm, and polyamide resin with a thickness of 0.025mm are really formed from the cell case outside-surface side in the lateral-surface section of this case.

[0040]

(Example 1 of a comparison)

The cell case which is not on the lateral surface **** about a double layer membrane was produced. The thickness of a flank is 1.126mm in the case used for 1.129mm and steam exsorption measurement in the case used for hydrogen gas leakage measurement. In addition, since the difference of the thickness of this case flank and the thickness of the case flank in an example 1 is as minute as 0.1mm or less, it can be considered that these are these conditions.

[0041]

The permeability of the hydrogen gas in the flank of this case and a steam was investigated to the cell case produced in the above-mentioned example 1 and the example 1 of a comparison. The obtained result is shown in Table 2 about the permeability of Table 1 and a steam about the permeability of hydrogen gas.

[0042]

[Table 1]

試料	厚さ (mm)	水素ガス透過度	水素ガス透過係数	
		$\text{cm}^3/\text{m}^2 \cdot 24\text{h} \cdot \text{atm}$	$\text{cm}^3 \cdot \text{mm}/\text{m}^2 \cdot 24\text{h} \cdot \text{atm}$	$\text{cm}^3 \cdot \text{cm}/\text{cm}^2 \cdot \text{s} \cdot \text{cmHg}$
比較例	1.129	692	781	1.19×10^{-9}
実施例	1.176	0.33	0.39	5.91×10^{-13}

When the double layer membrane which becomes with a metal and resin to hydrogen gas transmission coefficients being 781 cm^3 and $\text{mm/m}^2.24 \text{ h-atm}$ when there is no double layer membrane on the cell case lateral surface is formed on the lateral surface of a cell case, a hydrogen gas transmission coefficient is closer to 0.39 cm^3 and $\text{mm/m}^2.24 \text{ h-atm}$, and about 0 than Table 1. the double layer membrane which becomes with this, i.e., a metal, and resin -- a cell case lateral-surface top -- **** -- it is shown that it is possible to prevent nearly completely the hydrogen gas which leaks and comes out from the inside of a cell case by things.

[0044]

[Table 2]

試料	厚さ(mm)	水蒸気透過度	水蒸気透過係数
		$\text{g}/\text{m}^2 \cdot 24\text{h}$	$\text{g} \cdot \text{cm}/\text{cm}^2 \cdot \text{s} \cdot \text{cmHg}$
比較例	1.126	0.169	4.46×10^{-12}
実施例	1.219	0.017	4.79×10^{-13}

When the double layer membrane which becomes with a metal and resin to steam transmission coefficients being 4.46×10^{-12} g-cm/cm² and s-cmHg when there is no double layer membrane on the cell case lateral surface is formed on the lateral surface of a cell case, the steam transmission coefficient has become 4.79×10^{-13} g-cm/cm² and s-cmHg, and about [in case there is no double layer membrane] 1/10 from Table 2. the double layer membrane which becomes with this, i.e., a metal, and resin -- a cell case lateral-surface top -- **** -- it is shown that the amount of the steam which leaks and comes out from the inside of a cell case by things is controlled about 90%.

[0046]

As mentioned above, it was checked that the double layer membrane which contains the aluminum formed on the cell case lateral surface from the measurement result using the cell case of an example 1 and the example 1 of a comparison has the work which controls the leakage out of the case of hydrogen gas and a steam. In addition, this invention is not limited to the constituent used in the above-mentioned operation gestalt and the example.

[0047]

Thus, in the nickel hydoride battery which formed the double layer membrane containing aluminum in one on the cell case lateral surface, a battery life improves, as a result the maintenance free over a long period of time becomes possible.

[Brief Description of the Drawings]

[Drawing 1] The cell case where the double layer membrane which consists of a metal and resin on a side face was allotted

[Drawing 2] The cross section of the double layer membrane allotted on the cell case front face

[Description of Notations]

1 Cell Case Body

10 Battery Holder

12 Septum

2 Side Face of Cell Case

3 Double Layer Membrane

31 Resin Layer Which Plays a Role of a Binder

32 Metal Thin Layer Which Plays a Role of Gas Barrier

33 Resin Layer Which Carries Out Role from which Metal Thin Layer 32 is Protected

4 Lid of Cell Case

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The cell case where the double layer membrane which consists of a metal and resin on a side face was allotted

[Drawing 2] The cross section of the double layer membrane allotted on the cell case front face

[Description of Notations]

1 Cell Case Body

10 Battery Holder

12 Septum

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3 Double Layer Membrane

31 Resin Layer Which Plays a Role of a Binder

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33 Resin Layer Which Carries Out Role from which Metal Thin Layer 32 is Protected

4 Lid of Cell Case

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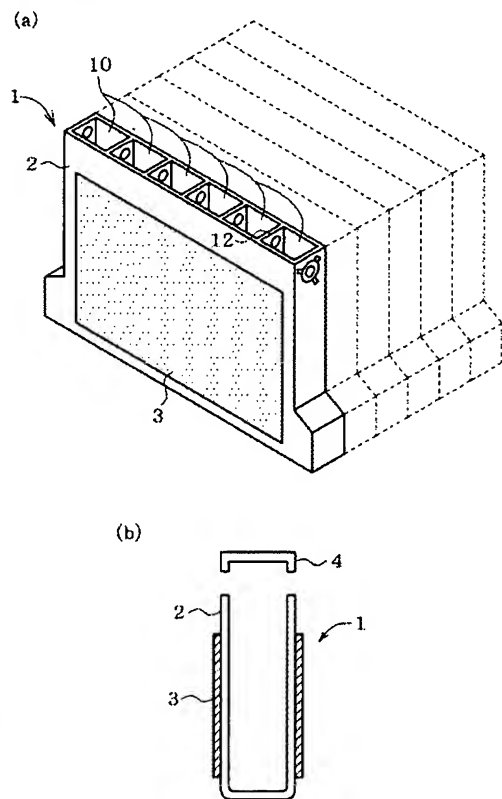
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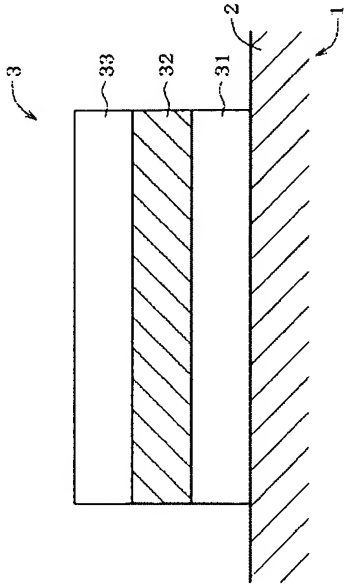
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DRAWINGS

[Drawing 1]



[Drawing 2]



[Translation done.]

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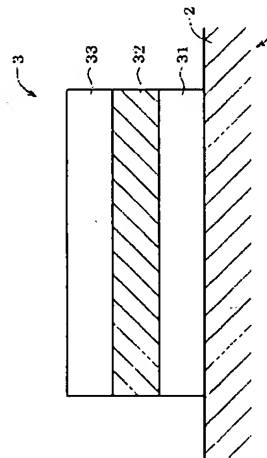
(54) 【発明の名称】 電池ケース及びその製造方法

(57) 【要約】

【課題】 ニッケル水素電池において、電池性能の低下を引き起こす水素分子や水蒸気の電池ケースの壁からの外への漏れを防止し、寿命が長く、長期間に渡るメンテナンスフリーが可能な電池ケースとその製造方法を提供する。

【解決手段】 ニッケル水素電池用の樹脂製電池ケースにおいて、少なくとも該ケース側部の一部外面上に、バインダーとしての役割を果たす樹脂層31を介して、水素分子や水蒸気の漏れを防止するためのガスバリアとしての役割を果たす金属箔もしくは金属蒸着層からなる金属薄層32を一体的に形成し、更にその上に金属薄層32の表面を腐食から保護する役割をする樹脂層33を形成する。

【選択図】 図2



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ABSTRACT:

PROBLEM TO BE SOLVED: To provide a battery case in a nickel metal-hydride battery and its manufacturing method, wherein leakage of hydrogen molecule and steam outside from the wall of the battery case causing deterioration of battery performance are prevented, and wherein a long life-time and the free maintenance over a long term are possible.

SOLUTION: In the resin-made battery case for the nickel metal-hydride battery, via a resin layer 31 playing a role as a binder, a metal thin layer 32 consisting of a metallic foil or vapor-deposited metal layer playing a role as a gas barrier to prevent the leakage of the hydrogen molecule and the steam is integrally formed at least on the outer face of a part of the case side part, and furthermore, a resin layer 33 to play a role of protecting the metal thin

layer 32 from corrosion is formed on this.

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